

POTTER

HSP-3603 HIGH-SPEED PRINTER

PRODUCT
DATA

3-204

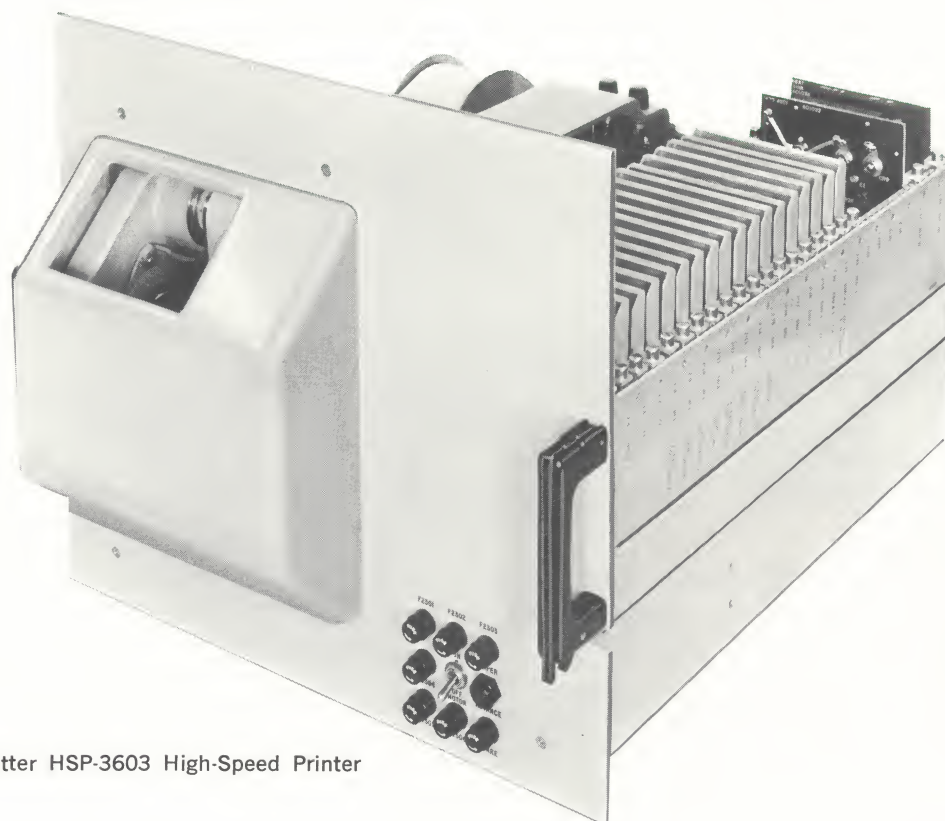


Figure 1 — Potter HSP-3603 High-Speed Printer

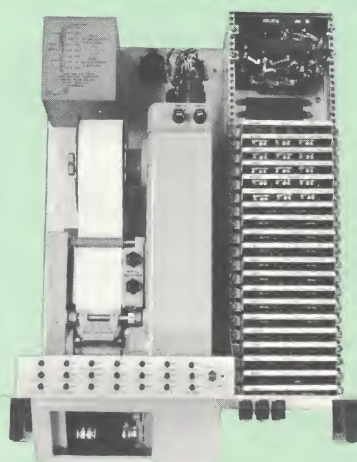


Figure 2 — Potter HSP-3603
High-Speed Printer Electronics

FEATURES

- Solid-state circuitry, mounted on keyed plug-in PCBs
- Printing speed of 600 lpm
- 400 feet of internal paper storage and supply facilities
- Free flight hammers eliminate the need for adjustments
- Convenient operator controls including test points
- Militarized construction meeting the applicable portions of: MIL-E-16400, MIL-T-21200, MIL-Q-9858
- Complete support documentation

DESCRIPTION

The Potter HSP-3603 Militarized High-Speed Printer is a series-parallel input type printer capable of printing up to 12 columns with 16 characters available per column at 600 lines per minute. Data is presented serially by character and parallel by bit, asynchronously up to 95 kc rate.

The printer is self-contained, consisting of a fixed mechanical and electronics unit, assembled on a rack mounted chassis. Logic circuits and power supply are mounted on keyed plug-in modules.

Utilizing a staggered character two-font drum, print quality is unsurpassed. Its solid-state electronics and field proven printer mechanism assure highest reliability.

OPERATING CONTROLS AND INDICATORS

1. Motor — ON-OFF Switch
2. Initial Power AC & DC controlled by user's equipment through printer power relay
3. "Paper Advance" pushbutton
4. Adjustable Line Space Potentiometer
5. Test points to allow simple isolation of a malfunction and for routine preventive maintenance
6. Additional operating controls located on Mechanical Unit
 - Paper Feed Forward
 - Paper Feed Reverse
7. Elapsed time indicator

SYSTEM OUTLINE

The HSP-3603 Militarized High Speed Printer offers a printer system which includes a line buffer. The buffer storage system is capable of receiving information asynchronously up to a 95 kc rate which is ideal for "on line" operation. This results in a simplified printer interface. Another desirable feature is the self contained paper storage and supply facilities for over 400 feet of paper.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7	COLUMN 8	COLUMN 9	COLUMN 10	COLUMN 11	COLUMN 12	SLUG NUMBER
N	0	0	0	0	0	0	0	0	0	0	0	BINARY CODE
E	1	1	1	1	1	1	1	1	1	1	1	0 0 0 0 1
T	2	2	2	2	2	2	2	2	2	2	2	0 0 1 0 3
B	3	3	3	3	3	3	3	3	3	3	3	0 0 1 1 4
K	4	4	4	4	4	4	4	4	4	4	4	0 1 0 0 5
S	5	5	5	5	5	5	5	5	5	5	5	0 1 0 1 6
W	6	6	6	6	6	6	6	6	6	6	6	0 1 1 0 7
H	7	7	7	7	7	7	7	7	7	7	7	0 1 1 1 8
L	8	8	8	8	8	8	8	8	8	8	8	1 0 0 0 9
*	9	9	9	9	9	9	9	9	9	9	9	1 0 0 1 10
P	R	E	T	E	X	E	G	H	D	A	R	1 0 1 0 11
D	U	S	P	M	D	R	K	R	I	S	*	1 0 1 1 12
+	A	M	B	A	P	U	D	C	W	N	E	1 1 0 0 13
-	L	P	F	N	S	T	A	E	C	K		1 1 0 1 14
C	M	I	N	L	U	A	C	X	Y	Z	S	1 1 1 0 15
												1 1 1 1 16

VALIDATION CHARACTER

Figure 3 — Drum Format

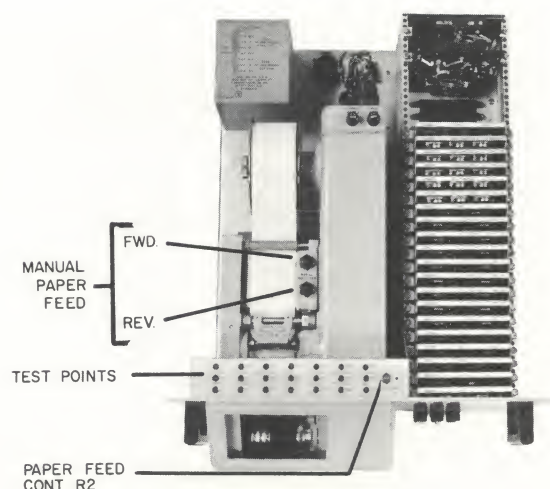
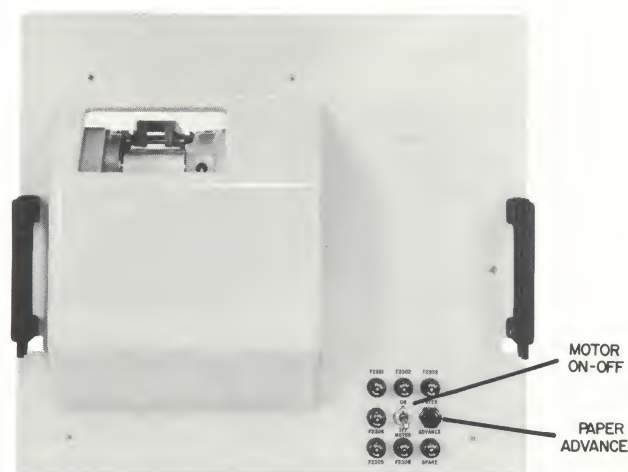


Figure 4 — Operating Controls

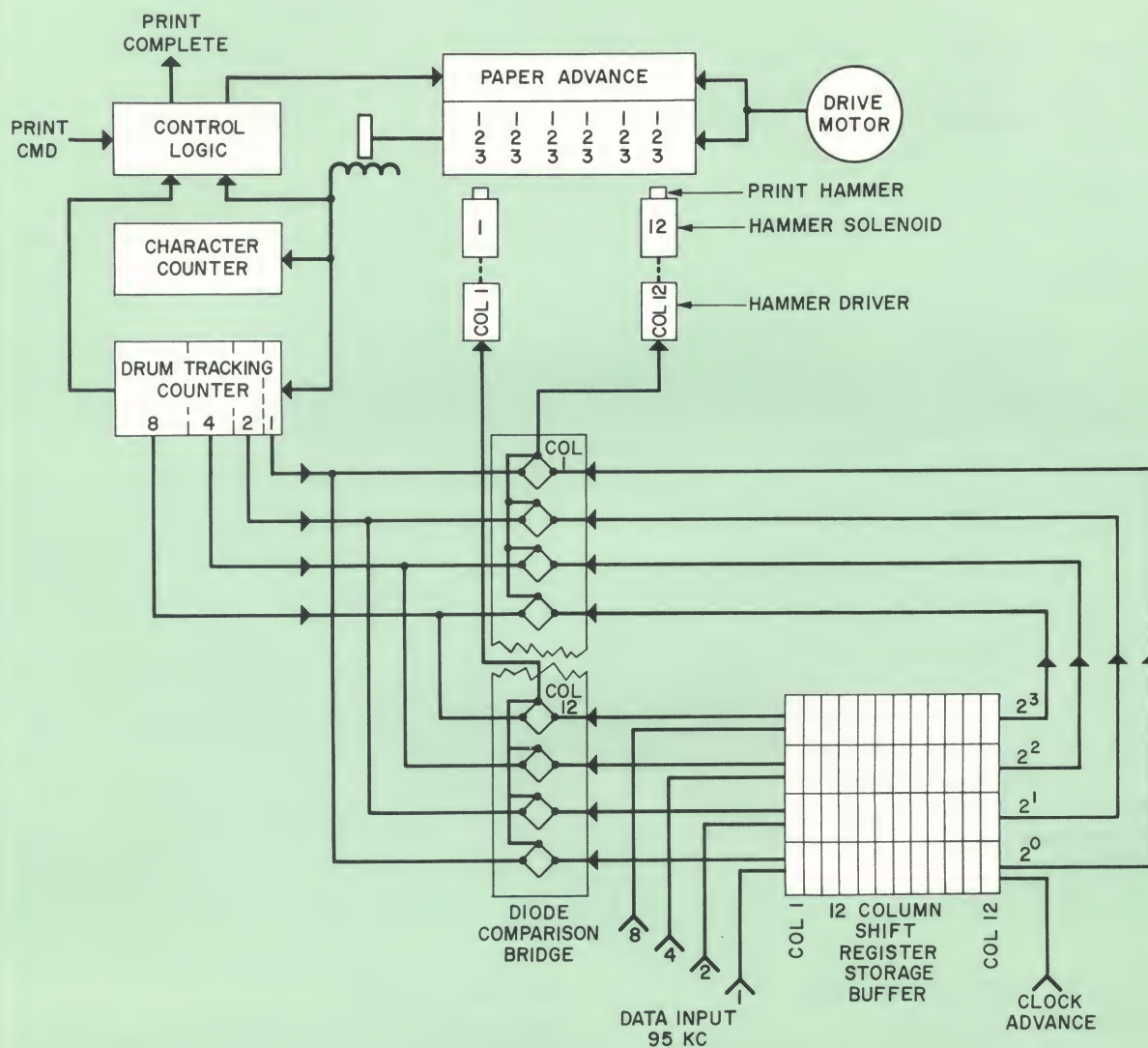


Figure 5 — Functional Block Diagram

ENVIRONMENTAL SPECIFICATIONS

A. TEMPERATURE	Operating: -20°C to $+55^{\circ}\text{C}$ Non-Operating: -62°C to $+85^{\circ}\text{C}$
B. ALTITUDE	Operating: 10,000 feet Non-Operating: 50,000 feet
C. VIBRATION	5 to 55 cycles at 10 g's
D. SHOCK	15 g's

SPECIFICATIONS

PRINTOUT SPEED	600 lines/minute
LINE CAPACITY	12 columns, standard
CHARACTER SELECTION	16 characters, standard
PAPER STOCK	Pressure sensitive — 400 foot capacity spool (supply and storage facilities contained in printer)
ELECTRONICS	The printer contains power supply and necessary logic required for printing and decoding of the information presented
INPUTS	Data — Information must be supplied parallel by bit and serial by character at a maximum input rate of 95 kc. Information must be presented in pulse form, 4 level (8421) binary coded. Clock pulse must precede the character presented by 2 microseconds
INPUT SIGNAL CHARACTERISTICS	AC or DC coupled pulse, width 2.5 milliseconds minimum Rise time — 1 μ sec maximum Amplitude: 8V $\pm$ IV
OUTPUTS	DC Load Gate: "0" volts indicates printer is ready to accept data " $-7.2V$ to $-10V$ " indicates printer busy. Optional — buffer ready — pulse output Supplied after the 12th clock to initiate the print cycle
PRINT COMMAND	The 12th column will yield normal printout. However, if the validation symbol is desired, a separate line may be energized and will print out the symbol immediately (see drum format)
VALIDATION CHARACTER	
INPUT POWER	A. 115 VAC, $\pm 10\%$, 400 cycle, single-phase @ 3 amperes B. 28 VDC, @ 2 amperes
DIMENSIONS	17½" H, 19" W, 22" D
WEIGHT	95 pounds, approximately

HIGH SPEED PERFORATED TAPE READERS AND SPOOLERS

Potter manufactures a line of high speed tape readers and spoolers that have proven successful in a variety of military and commercial applications.

Constructed to military specifications, these high speed systems provide synchronous, bidirectional operation at 300 characters/second. Asynchronously, these units will operate at 70 characters/second.

Product features include photoelectric sensing with silicon solar cells for high reliability, completely transistorized silicon semiconductors, high speed reading at 5, 6, 7 or 8 level perforated tape, individual sensitivity adjustments and self-contained regulated power supply.

POTTER SERVICE

Potter Repair Centers have been established in strategic locations within the continental United States and abroad, to support the entire Potter product line.

Staffed by trained representatives, these centers are equipped to effect on-site installation of equipment, and to perform repair, maintenance and overhaul functions.

In addition, Potter spare parts are available on a 24-hour delivery basis to meet any customer's emergency requirements — within 72 hours for standard parts under normal conditions. Potter also offers provisioning and logistics capabilities to meet all existing military specifications.

Information subject to change without notice.



POTTER INSTRUMENT COMPANY, INC.

151 SUNNYSIDE BOULEVARD • PLAINVIEW, NEW YORK • 516 OVERBROOK 1-3200

POTTER

HSP-3604 HIGH-SPEED MINIATURIZED PRINTER

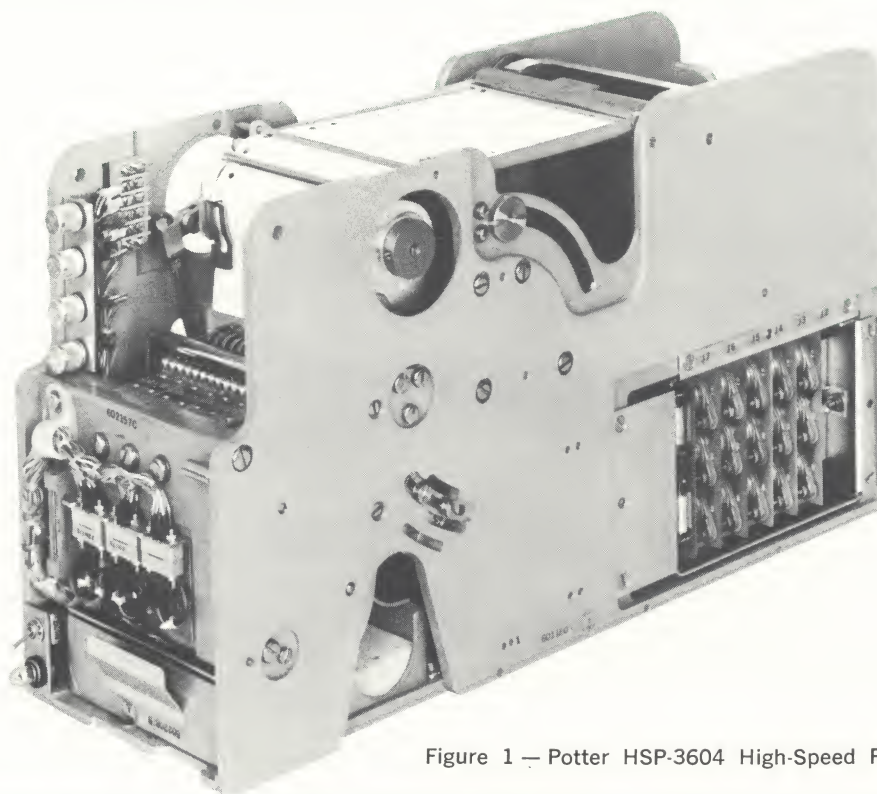


Figure 1 — Potter HSP-3604 High-Speed Printer

FEATURES

- Alphanumeric printing at 600 lpm
- Quick replaceable drum to facilitate various drum formats (essential to many military applications)
- Accommodation of up to 4 part paper; with internal supply and storage
- Immediate view of last line printed
- Solid-state circuitry, mounted on keyed plug-in PCBs
- Military approved to meet applicable portions of: MIL-E-16400, MIL-T-21200, MIL-Q-9858
- New Elastomeric torsion bearing print hammers
- Complete support documentation

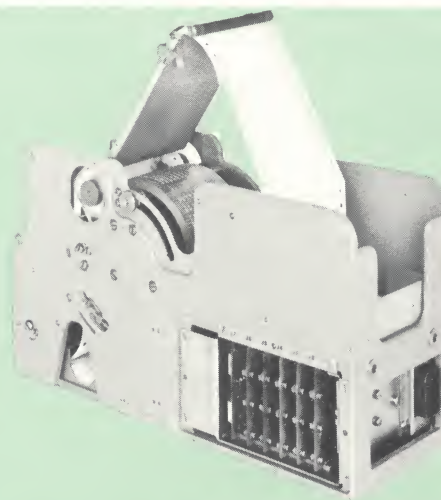


Figure 2 — Potter HSP-3604
High-Speed Printer with Control Electronics

DESCRIPTION

The Potter HSP-3604 is a high speed militarized printer capable of printing up to 10 lines per second in a 26 column format with 64 characters available per column (parallel printing mode). Serial, character-at-a-time, printing will allow a minimum print speed of 10 characters per second. A typical message will provide an average speed of 80 characters per second. Its

unique design, incorporating the latest state-of-the-art advancements, yields the ultimate in reliability and design simplification. Due to a revolutionary new drum design, only 13 hammer modules are employed to optimize reliability and reduce system costs. Incorporation of basic electronics allows the flexibility of printing in either a serial or parallel mode.

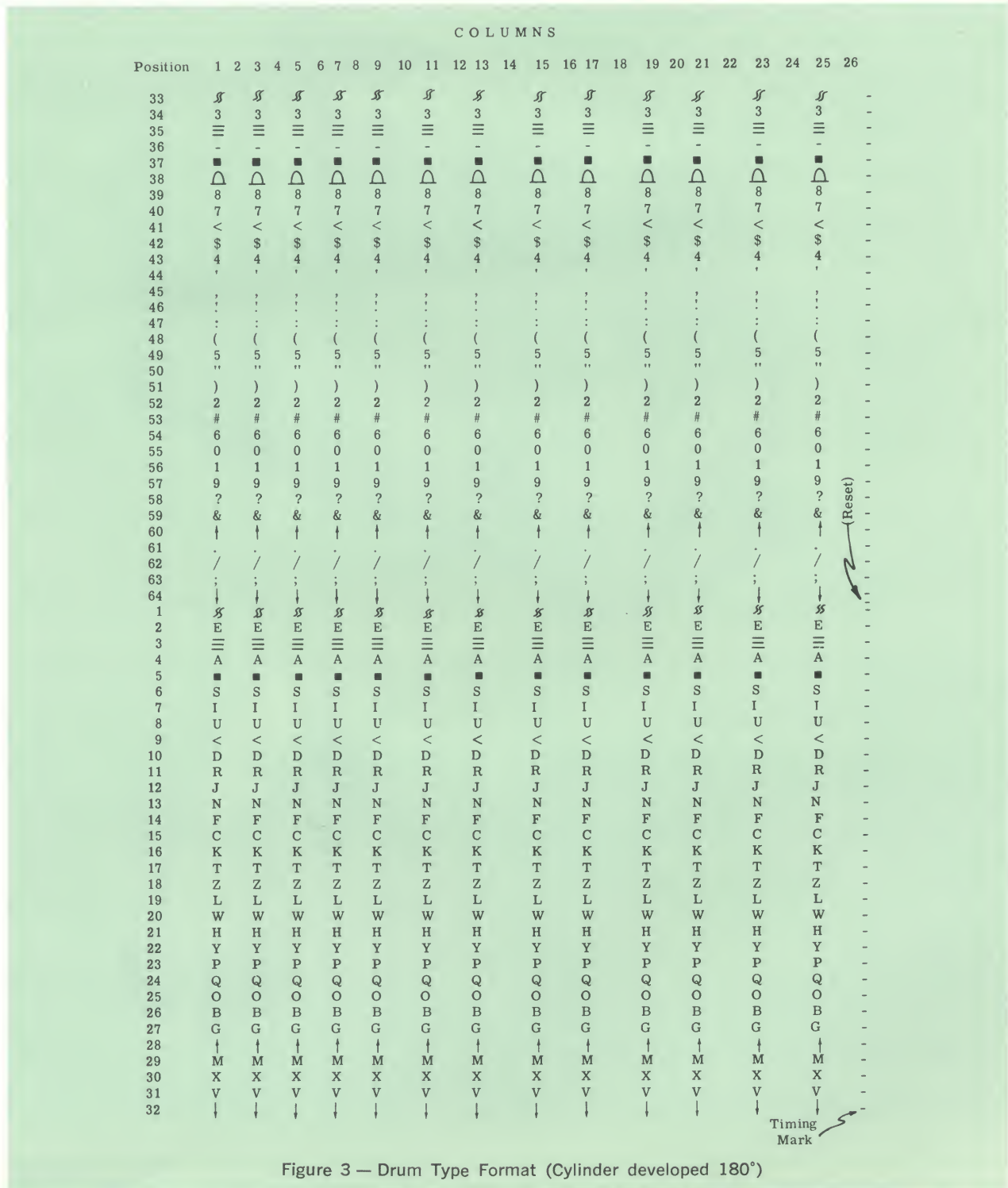


Figure 3 — Drum Type Format (Cylinder developed 180°)

HAMMER DRIVERS

The 13 hammer drivers and selection gates are packaged on five identical printed circuit modules. The schematic of a typical hammer driver circuit is shown in Figure 6.

TIMING AMPLIFIER

A reluctance pickup senses the etched timing marks on the drum periphery (Figure 3). The timing module detects and shapes the timing signal to produce the pulse train illustrated in Figure 7.

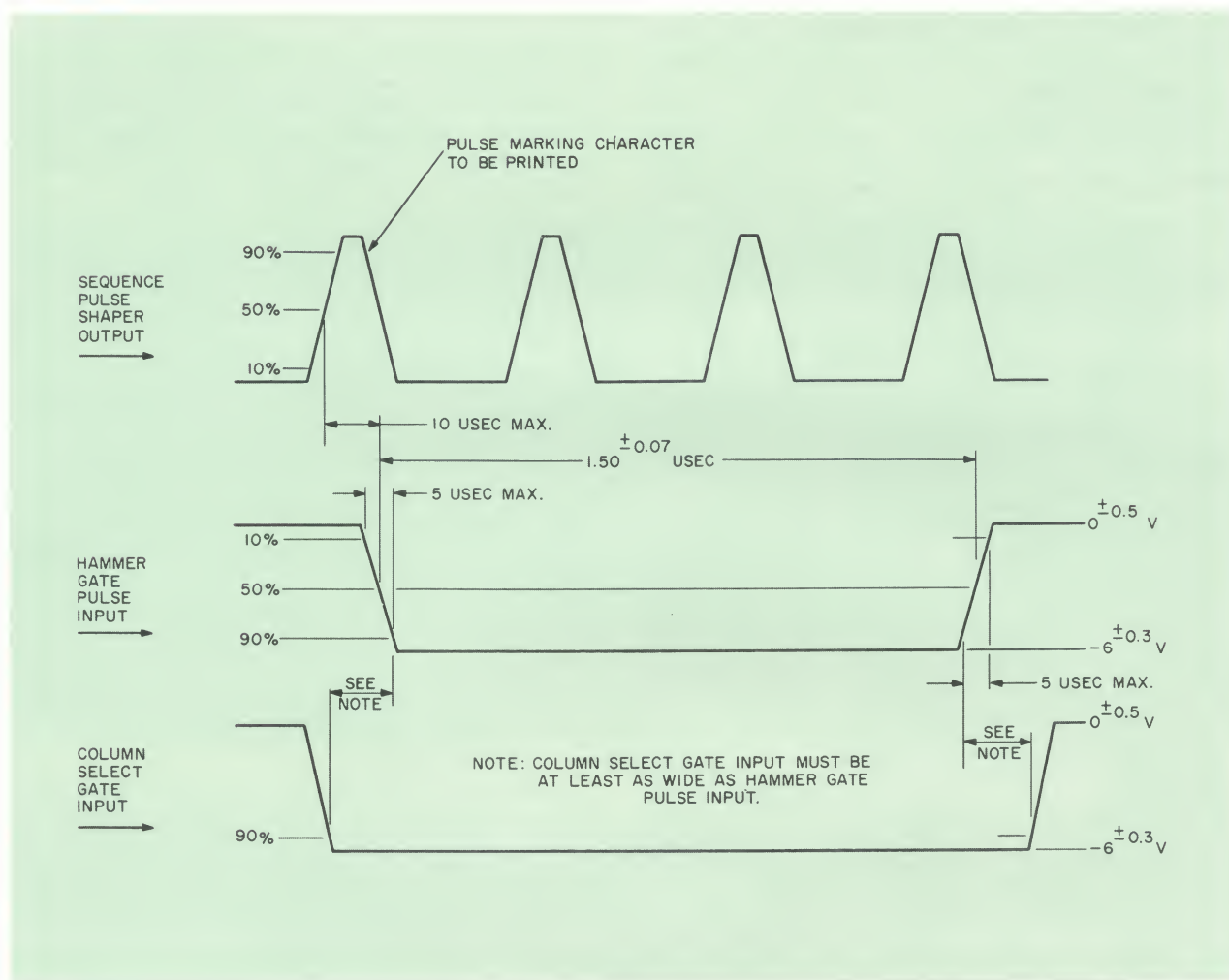


Figure 8 — Hammer Gate Timing Detail

The printer and its associated basic electronics is packaged for mounting in a container 5.4" in width, 8.8" in height, and 15.8" in depth. The HSP-3604 contains the following basic assemblies:

1. Type Drum and Timing Mechanism
2. Paper Transport Assembly
3. Print Hammers
4. Drive Motor
5. Hammer Drivers
6. Sync Pulse Amplifier
7. Paper Feed Driver

SYSTEM OUTLINE

The HSP-3604 Printer is designed specifically for military applications where reliability, miniaturization, ease of maintenance and low cost are essential requirements.

PRINT DRUM AND TIMING MECHANISM

A horizontally mounted drum containing 26 columns with 64 printable symbols is utilized.

An odd-even drum format, illustrated by Figure 3, provides the following advantages:

- Minimized power supply requirements
- Eliminates ghosting
- Reduces the number of hammer drivers and associated circuitry due to the use of double width hammers.

Besides containing the 64 characters, the print drum will have the timing (character identification) marks etched on its periphery. A timing mark will appear for each character which will be sensed by a reluctance pickup.

If the application demands, replacement of the drum may be accomplished in less than 30 seconds. to facilitate various drum formats.

PAPER TRANSPORT ASSEMBLY

Paper feed will be implemented by a rotary solenoid which is coupled to a unidirectional clutch, pin feed tractor assembly. This paper advance system is superior to the normal rotating disc clutch-brake arrangement in that the mechanism is active only during the paper feed cycle.

Facilities for storage and supply of pressure-sensitive fanfold paper are contained within the printer. Operator convenience is further enhanced by a unique paper take-up system. If access to the printed material is desired, a lever type mechanism will retract the paper for handling by the operator. Upon examination and release of the printed material, the paper will automatically return to the storage bin.

PRINT HAMMERS

The Potter exclusive odd-even drum format allows the use of double headed hammers, therefore, only 13 hammer modules and associated driving circuitry are required to provide printout in 26 columns.

The hammer module is a result of many years experience in producing electro-mechanical print hammers. An extensive research and development program undertaken by Potter has resulted in an extremely reliable, rugged hammer module. Polaris equipped submarines including those being fabricated for the United Kingdom incorporate the Potter Teleprinter Mark I in their fire control, missile checkout and navigation systems.

The use of a high grade, chrome-nickel molybdenum tool steel and the Elastomeric Bearing has produced a hammer with an infinite life expectancy. See Figures 4 and 5.

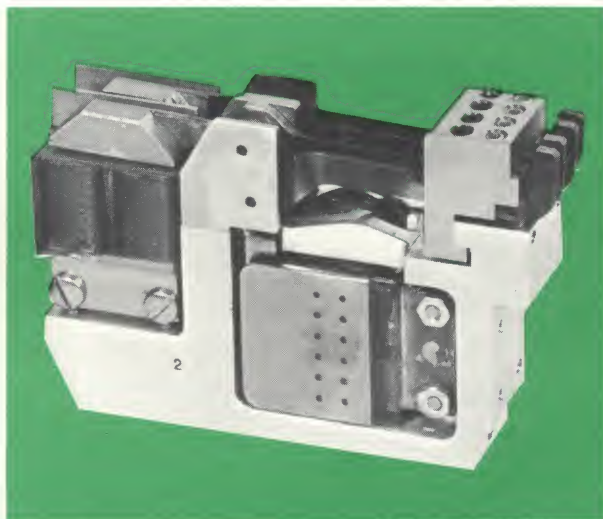


Figure 4 — Hammer Module

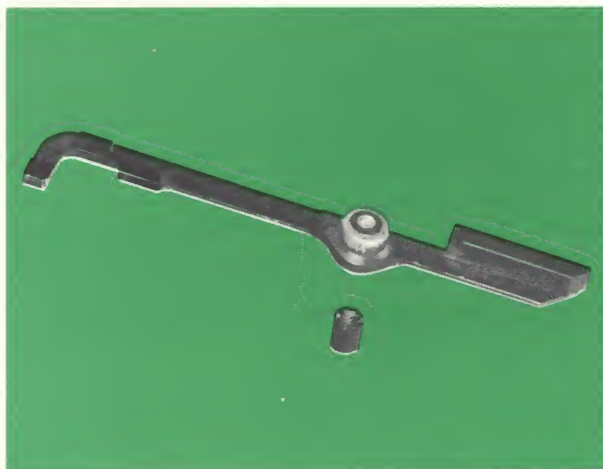


Figure 5 — Torsion Bearing

DRIVE MOTOR

The drive motor is a militarized induction motor, secured to the main body housing, to assure long life.

ELECTRONICS

The HSP-3604 contains the following basic electronics:

- Hammer Drivers
- Timing Amplifier
- Paper Feed Driver

Modular concept allows the replacement of the en-

tire electronics package by removal of several simple fasteners. Individual replacement of the printed circuit modules can also be accomplished easily.

The printed circuit modules are fabricated to military standards. The boards are glass epoxy with gold plated wiring and nickel plated contacts.

A brief description of the Electronics is contained in the following paragraphs. It is emphasized that the circuits are designed utilizing Potter Instrument Company Engineering standards to assure maximum reliability. Figures 7 and 8 detail the timing requirements for the HSP-3604 Printer.

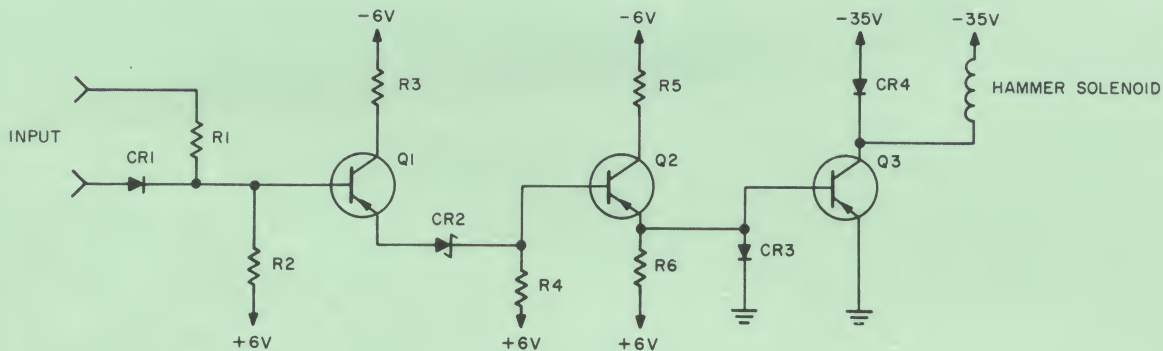
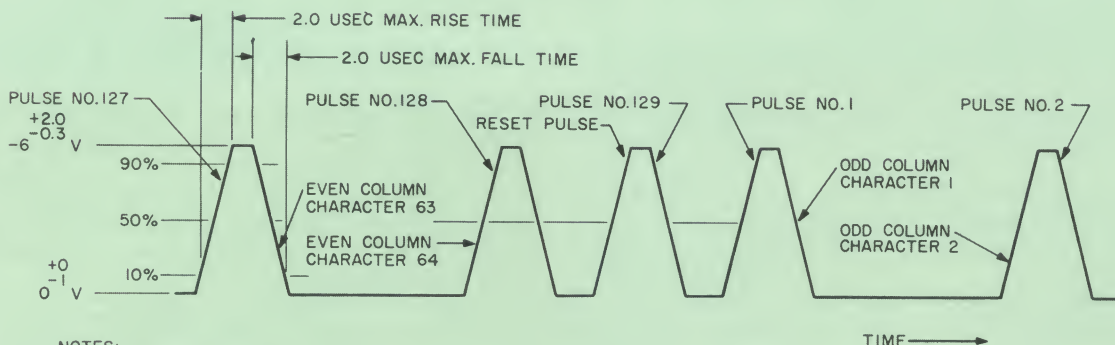


Figure 6 — Typical Hammer Driver Circuit



NOTES:

1. SIGNAL SHOWN NOT LOADED.
2. THERE ARE 129 PULSES PER REVOLUTION.
 - a. ONE RESET PULSE.
 - b. 64 ODD COLUMN CHARACTER PULSES.
 - c. 64 EVEN COLUMN CHARACTER PULSES.

Figure 7 — Timing Amplifier Output Detail

SPECIFICATIONS

PRINTOUT SPEED	600 lines per minute
DRUM SPEED	800 R.P.M.
LINE CAPACITY	26 characters, standard
CHARACTER SELECTION	64 characters, standard
COPIES	Original plus 3 copies
PAPER STOCK	Pressure sensitive — approx. 100 foot capacity, fanfold, (supply and storage facilities contained in printer)
PANEL CONTROLS & INDICATORS	AC Power "ON-OFF" Switch, Low Paper Light
ELECTRONICS	I. Timing pulse amplifier. Provides identification pulse for each character plus one reset pulse indicating start of font. See figure 5. II. Paper feed driver (see figure 4). Identical to Hammer Driver. For each single line of advance, a negative 6 volt pulse, for 15 milliseconds duration is required. III. Hammer and Driver and Hammer Selection Gates. See figure 3 and 4.
AC POWER	115 volts, 60 cycle, single-phase, .25 amperes
DC POWER	—6 volts, 250 ma +6 volts, 250 ma —35 volts, 3 amperes
SIZE	5.4" W, 8.8" H, 15.8" D
WEIGHT	30 pounds, approximately

ENVIRONMENTAL SPECIFICATIONS

A. TEMPERATURE	Operating: -20°C to $+55^{\circ}\text{C}$ Non-Operating: -62°C to $+85^{\circ}\text{C}$
B. ALTITUDE	Operating: 10,000 feet Non-Operating: 50,000 feet
C. VIBRATION	.5 to 55 cycles at 10 g's
D. SHOCK	15 g's

HIGH SPEED PERFORATED TAPE READERS AND SPOOLERS

Potter manufactures a line of high speed tape readers and spoolers that have proven successful in a variety of military and commercial applications.

Constructed to military specifications, these high speed systems provide synchronous, bidirectional operation at 300 characters/second. Asynchronously, these units will operate at 70 characters/second.

Product features include photoelectric sensing with silicon solar cells for high reliability, completely transistorized silicon semiconductors, high speed reading at 5, 6, 7 or 8 level perforated tape, individual sensitivity adjustments and self-contained regulated power supply.

POTTER SERVICE

Potter Repair Centers have been established in strategic locations within the continental United States and abroad, to support the entire Potter product line.

Staffed by trained representatives, these centers are equipped to effect on-site installation of equipment, and to perform repair, maintenance and overhaul functions.

In addition, Potter spare parts are available on a 24-hour delivery basis to meet any customer's emergency requirements — within 72 hours for standard parts under normal conditions. Potter also offers provisioning and logistics capabilities to meet all existing military specifications.

Information subject to change without notice.



POTTER INSTRUMENT COMPANY, INC.

151 SUNNYSIDE BOULEVARD • PLAINVIEW, NEW YORK • 516 OVERBROOK 1-3200